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1929

PROGRESS

of the

Barberry Eradication Campaign

in

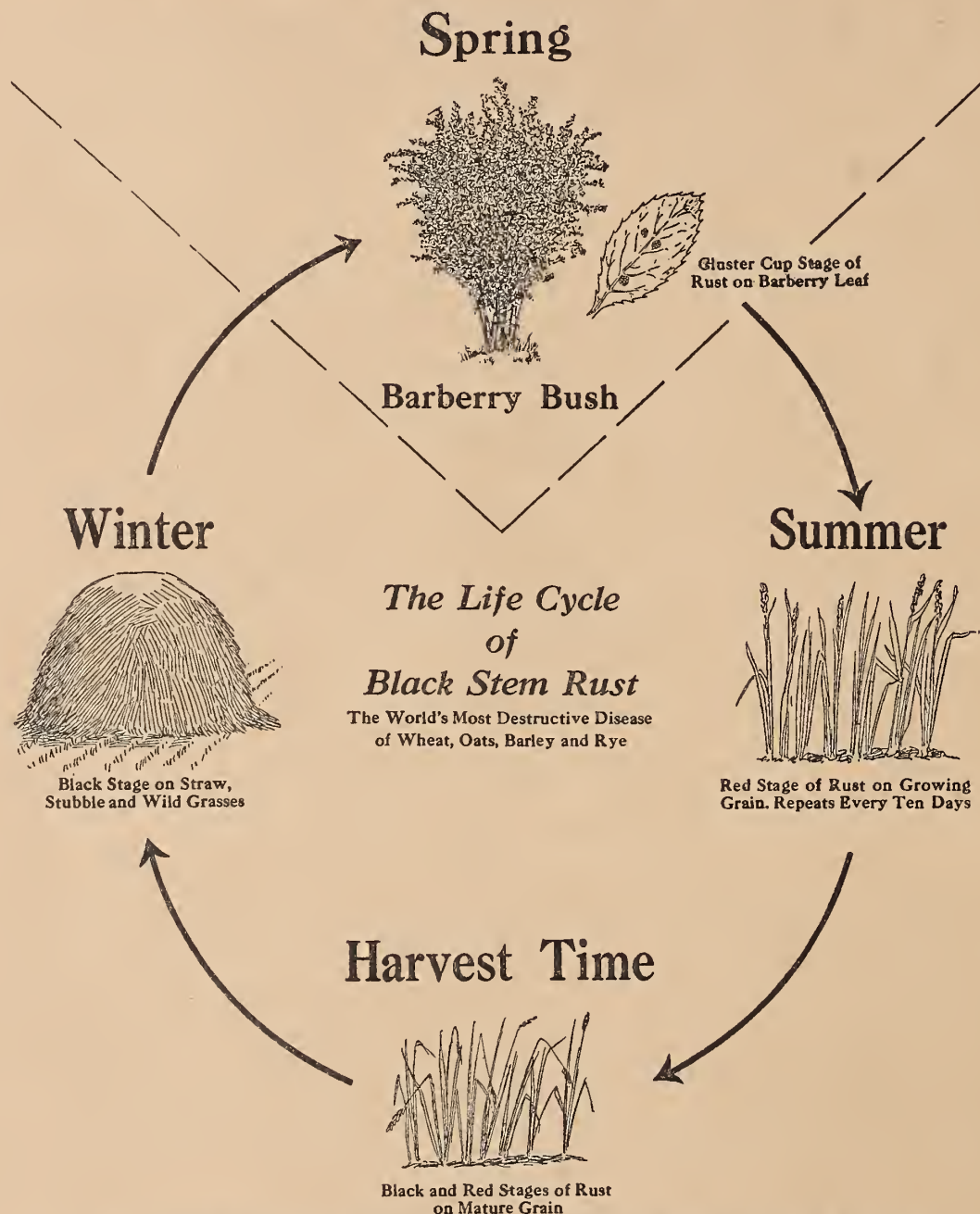
MONTANA in 1929



Our Grain Crops Must Be Protected from Black Stem Rust

Barberry Eradication Pays

Remove the Barberry and Break the Rust Cycle



All Common Barberries act as starting points for Black Stem Rust early each spring. By destroying the barberry the early spring source of black stem rust is eliminated. The Common Barberry provides a means to bridge the gap between the black stage on grain in the fall and the red stage of the rust on grains and grasses the following spring.

**BOOST BARBERRY ERADICATION—A PRACTICAL RUST
CONTROL MEASURE**

PROGRESS OF THE BARBERRY ERADICATION CAMPAIGN

IN MONTANA AND WYOMING, 1929.

By W. L. Popham, Agent, 1/

Office of Barberry Eradication, 2/ Bureau of Plant Industry,

United States Department of Agriculture.

Introduction

The United States produced approximately 300,000,000 bushels of spring wheat in 1929. More than three-fourths of this quantity, or 275,000,000 bushels, was grown in 13 of the upper Mississippi Valley States, namely, Montana, Wyoming, Colorado, North Dakota, South Dakota, Nebraska, Minnesota, Iowa, Michigan, Illinois, Wisconsin, Ohio, and Indiana. These States cooperate with the United States Department of Agriculture in conducting the barberry-eradication campaign, and are directly concerned with the control of black stem rust. Common barberry (Berberis vulgaris L.) is the only alternate host for the parasite causing this disease of wheat, oats, barley, rye, and some of the native grasses.

The eradication of the common barberry was recommended by plant pathologists as a means of reducing losses from black stem rust, following the severe epidemic of this disease in 1916. In that year black stem rust losses in the principal spring-wheat States of the United States amounted to more than 180,000,000 bushels, with the result that this fungous disease became recognized as the most serious pest with which the spring-wheat growers had to contend.

Continuous investigation since black stem rust first became a disease of economic importance in the United States has provided substantial evidence that the common barberry is the most important factor contributing to stem-rust losses in the Northern States. The removal of all barberry bushes in the barberry-eradication area will mean a marked delay in the development of rust, as the spores which spread this disease can not survive the alternate freezing and thawing of this area. The black or winter stage of the rust, which lives through the winter on old straw or stubble, can not infect grain in the spring without first attacking the common barberry, then spreading from it to the growing crop. The normal spread of rust from the South, where the red or repeating stage of stem rust lives throughout the year, will not be a serious factor, according to results obtained from investigations made since 1916. The evidence accumulated during 11 years of investigation in con-

1/ State Leader of barberry eradication in Montana and Wyoming.

2/ From the beginning of the campaign in 1918 until January 1, 1930, barberry eradication was a project of the Office of Cereal Crops and Diseases, of the Bureau of Plant Industry. On January 1, 1930, the Office of Barberry Eradication was established as a separate unit of the Bureau.

nection with the barberry-eradication campaign indicates that losses due to stem rust will be reduced gradually as many of the remaining common barberry bushes are eliminated from the spring-wheat States.

Organization, Financing, and Personnel

The barberry-eradication campaign is under Federal supervision, and is financed mainly by the United States Department of Agriculture. The campaign was begun in 1918 by this Department as a cooperative project with each of the 13 States in the barberry-eradication area, aided by several independent organizations interested in small-grain production. State departments of agriculture and State colleges in each of the States have given excellent cooperation. The Conference for the Prevention of Grain Rust, with headquarters in Minneapolis, Minn., was organized by a group of business men to give financial and cooperative aid in conducting this campaign to a successful completion.

The campaign is now directed by the Office of Barberry Eradication of the Bureau of Plant Industry, United States Department of Agriculture. The activities in each State are supervised by a State Leader, except in Montana and Wyoming, where one man supervises the work in the two States. His headquarters is at the Montana State College, Bozeman, Mont.

In these two States 12 to 14 field agents are employed for three or four of the summer months. These agents are selected because of special training in plant disease control work. In their selection particular attention is given to personality, ability, farm experience, and their record of past work. The men are given special training in preparation for the particular duties they are to perform. They also are instructed how to handle inquiries pertaining to other lines of agriculture.

Progress of the Campaign

The survey in Montana in 1929 has been entirely of the intensive type. The first survey was completed in 1928, and the season just past has been spent in making an intensive second survey of parts of Flathead and Fergus Counties. In these two counties common barberry bushes have escaped cultivation, and, in some cases, they have spread over extensive areas, making the task of complete eradication extremely difficult.

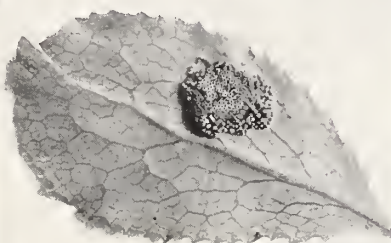
Four hundred and forty-eight bushes and more than 100 seedlings were destroyed on 17 different properties in 1929. All the bushes found in Fergus County were located in the timber and along the brush-covered hills adjacent to the Judith River. In Flathead County most of the bushes were found in the vicinity of Holt Ferry on Flathead River, just a few miles north of Flathead Lake. Some escaped bushes also were found on the west shore of the lake. On a few properties in Flathead County

BLACK STEM RUST SPREADS FROM COMMON BARBERRIES



to Wheat, Oats, Barley, Rye and other Grasses.

Black Stem Rust as it appears on the leaves of the Common Barberry



Enlarged single leaf



Plump healthy grain



Shriveled rusted grain

DANGEROUS NEIGHBORS



Common Barberry Bushes growing near grain fields

Report Common Barberry bushes you may find to your State Leader of Barberry Eradication.



Common Barberry is harmful, destroy



Japanese Barberry is harmless, do not destroy



barberry bushes were found that had been planted for ornamental purposes. These had been overlooked on the first survey.

During the entire campaign, barberry bushes were found in 33 counties in Montana and in 15 counties in Wyoming. The records show that 34,682 barberry bushes and seedlings have been destroyed on 423 different properties in Montana, and 4,154 bushes and seedlings on 96 properties in Wyoming.

NUMBER OF BARBERRY BUSHES AND SEEDLINGS

FOUND AND DESTROYED IN MONTANA DURING THE ENTIRE CAMPAIGN

FROM 1918 to 1929, INCLUSIVE

| Counties | Barberry Bushes | | Seedlings | |
|-----------------|-----------------|-----------|-----------|-----------|
| | Found | Destroyed | Found | Destroyed |
| Beaverhead | 18 | 18 | 0 | 0 |
| Big Horn | 0 | 0 | 0 | 0 |
| Blaine | 20 | 20 | 0 | 0 |
| Broadwater | 11 | 11 | 0 | 0 |
| Carbon | 200 | 200 | 215 | 215 |
| Carter | 0 | 0 | 0 | 0 |
| Cascade | 150 | 150 | 0 | 0 |
| Chouteau | 80 | 80 | 0 | 0 |
| Custer | 147 | 147 | 0 | 0 |
| Daniels | 0 | 0 | 0 | 0 |
| Dawson | 442 | 442 | 0 | 0 |
| Deer Lodge | 4 | 4 | 0 | 0 |
| Fallon | 0 | 0 | 0 | 0 |
| Fergus | 457 | 457 | 0 | 0 |
| Flathead | 4,712 | 4,712 | 2,492 | 2,492 |
| Gallatin | 391 | 386 | 169 | 169 |
| Garfield | 0 | 0 | 0 | 0 |
| Glacier | 0 | 0 | 0 | 0 |
| Golden Valley | 0 | 0 | 0 | 0 |
| Granite | 0 | 0 | 0 | 0 |
| Hill | 3 | 3 | 0 | 0 |
| Jefferson | 0 | 0 | 0 | 0 |
| Judith Basin | 0 | 0 | 0 | 0 |
| Lake | 844 | 844 | 821 | 821 |
| Lewis and Clark | 433 | 481 | 349 | 349 |
| Liberty | 0 | 0 | 0 | 0 |
| Lincoln | 22 | 22 | 35 | 35 |
| McCone | 0 | 0 | 0 | 0 |
| Madison | 64 | 64 | 1,500 | 1,500 |
| Meagher | 0 | 0 | 0 | 0 |
| Mineral | 3 | 3 | 0 | 0 |

| Counties | Barberry Pushes | | Seedlings | |
|--------------|-----------------|-----------|-----------|-----------|
| | Found | Destroyed | Found | Destroyed |
| Missoula | 417 | 417 | 14,573 | 14,573 |
| Musselshell | 50 | 50 | 0 | 0 |
| Park | 338 | 338 | 0 | 0 |
| Phillips | 0 | 0 | 0 | 0 |
| Prairie | 0 | 0 | 0 | 0 |
| Powder River | 0 | 0 | 0 | 0 |
| Pondera | 0 | 0 | 0 | 0 |
| Powell | 115 | 115 | 0 | 0 |
| Ravalli | 636 | 636 | 0 | 0 |
| Richland | 14 | 14 | 0 | 0 |
| Roosevelt | 0 | 0 | 0 | 0 |
| Rosebud | 20 | 20 | 0 | 0 |
| Sanders | 432 | 432 | 0 | 0 |
| Sheridan | 0 | 0 | 0 | 0 |
| Stillwater | 27 | 27 | 35 | 35 |
| Silverbow | 8 | 8 | 100 | 100 |
| Sweet Grass | 10 | 10 | 0 | 0 |
| Teton | 0 | 0 | 0 | 0 |
| Toole | 1 | 1 | 0 | 0 |
| Treasure | 0 | 0 | 0 | 0 |
| Valley | 6 | 6 | 0 | 0 |
| Wheatland | 0 | 0 | 0 | 0 |
| Wibaux | 127 | 127 | 0 | 0 |
| Yellowstone | 2,831 | 2,830 | 1,268 | 1,268 |
| Total | 13,133 | 13,125 | 21,557 | 21,557 |

Grand total bushes and seedlings found 34,690

Grand total bushes and seedlings destroyed 34,682

NUMBER OF BARBERRY BUSHES AND SEEDLINGS

FOUND AND DESTROYED IN WYOMING DURING THE ENTIRE CAMPAIGN

FROM 1918 to 1929, INCLUSIVE

| Counties | Barberry Bushes | | Seedlings | |
|-------------|-----------------|-----------|-----------|-----------|
| | Found | Destroyed | Found | Destroyed |
| Albany | 58 | 58 | 0 | 0 |
| Big Horn | 7 | 7 | 0 | 0 |
| Campbell | 0 | 0 | 0 | 0 |
| Carbon | 2 | 2 | 0 | 0 |
| Converse | 69 | 69 | 0 | 0 |
| Crook | 72 | 72 | 1 | 1 |
| Fremont | 4 | 4 | 0 | 0 |
| Goshen | 0 | 0 | 0 | 0 |
| Hot Springs | 0 | 0 | 0 | 0 |
| Johnson | 2 | 2 | 0 | 0 |
| Laramie | 3,119 | 3,032 | 26 | 26 |
| Lincoln | 150 | 150 | 0 | 0 |
| Matrona | 110 | 110 | 0 | 0 |
| Niobrara | 2 | 2 | 0 | 0 |
| Park | 172 | 172 | 26 | 26 |
| Platte | 29 | 29 | 0 | 0 |
| Sheridan | 256 | 256 | 0 | 0 |
| Sublette | 0 | 0 | 0 | 0 |
| Sweetwater | 3 | 3 | 0 | 0 |
| Teton | 0 | 0 | 0 | 0 |
| Unita | 133 | 133 | 0 | 0 |
| Washakie | 0 | 0 | 0 | 0 |
| Weston | 0 | 0 | 0 | 0 |
| Total | 4,188 | 4,101 | 53 | 53 |

Grand total bushes and seedlings found 4,241

Grand total bushes and seedlings destroyed 4,154

Slow Intensive Survey Necessary

An intensive survey, such as that of the past summer, is necessary in a number of the central and western counties of Montana and in the southeastern and northern counties of Wyoming. Barberry bushes were first planted in these areas many years ago, and in some localities they have escaped cultivation. In order to clean up such locations it is necessary that all groves, creek bottoms, timberland, orchards, and fence rows be carefully inspected to locate bushes which have grown from seed

scattered by birds or other animals. The successful completion of the barberry-eradication campaign depends (1) upon the destruction of all fruiting bushes, whether planted or escaped, and (2) upon the eradication of such bushes and seedlings as may develop from seed previously scattered by the many different agencies. To make an intensive survey of entire counties is the task confronting those in charge of barberry activities, if the common barberry is to be completely eradicated from the spring-wheat area.

Education and Publicity

Educational activities in connection with the actual eradication in the field is important for at least two reasons. First, the field agents of the United States Department of Agriculture are very often assisted in locating bushes by property owners who have learned to identify the common barberry or to recognize rust when it first appears in the early summer, and second, seed scattered by birds may produce barberry bushes in unsuspected places. These may be overlooked by the field agents, unless the locations are noted and reported by property owners.

In both Montana and Wyoming particular attention was given to educational work during the past season. Material for studying the methods of controlling black stem rust was supplied to Montana schools. News articles were sent to local and daily papers, and a demonstration illustrating the different phases of the barberry-eradication campaign was arranged at a number of the larger fairs of the State.

In Wyoming the educational activities were limited to newspaper articles and a demonstration at the State Fair. Particular emphasis was placed on newspaper articles, some of which reached every newspaper in the State, the object being to make clearer to grain growers the relation of common barberry to the development of stem rust, and to urge the reporting of bushes to the Barberry Office, State College, Bozeman, Mont. Through the use of newspapers, fair demonstrations, circulars, and lesson material for schools, it is hoped that the public may become acquainted with the life history of black stem rust. It is important that property owners, whether or not directly interested in small-grain production, should realize the necessity of destroying all common barberry bushes to prevent further spread of the bush, and to insure the continued reduction of losses from black stem rust.

Rusts in Montana and Wyoming, 1929

Very little damage occurred from black stem rust in either Montana or Wyoming in 1929. The western half of Montana was entirely free from stem rust until almost all of the spring wheat was harvested. In the southeastern part of the State a sprinkling of rust appeared late in the season, but there was very little injury even in the late maturing fields.



FLOWERS
(yellow)



BERRIES
(bright red)

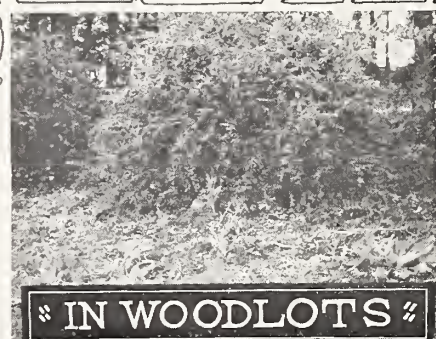
Where Barberry Bushes Grow



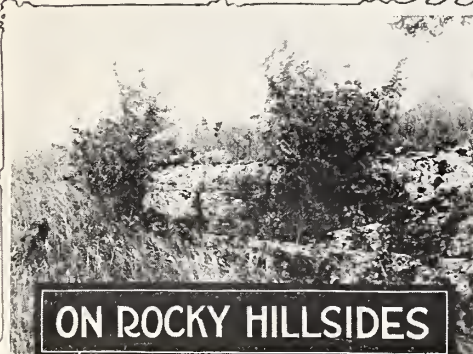
IN DOORYARDS



BIRDS CARRY BARBERRY SEEDS SEVERAL MILES, DROPPING THEM AMONG ROCKS AND IN OUT-OF-THE-WAY PLACES



IN WOODLOTS



ON ROCKY HILLSIDES



Barberries spread by birds



AS HEDGE FENCES



UNDER OTHER
SHRUBS and TREES





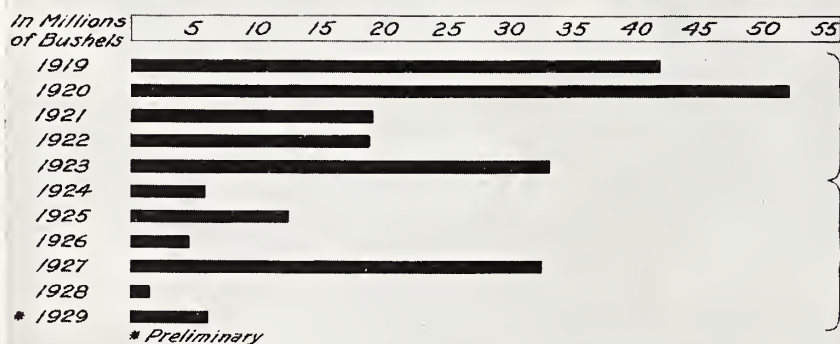
Salting a bush



Sprouts from a dug bush

Common Salt Kills Barberry Bushes and Prevents Sprouting

Wheat Losses in Barberry Eradication Area, 1919-1929

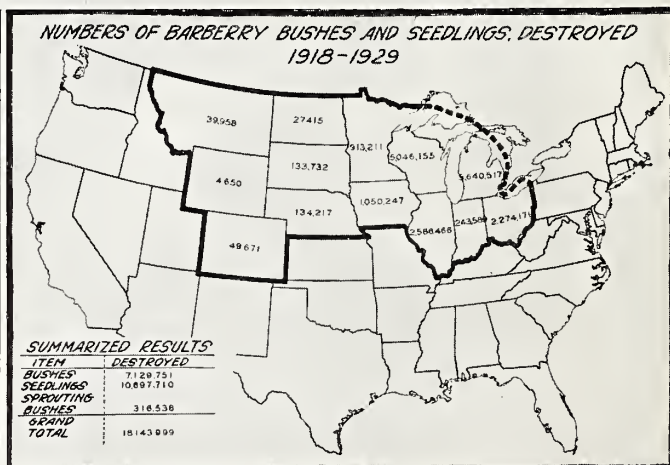
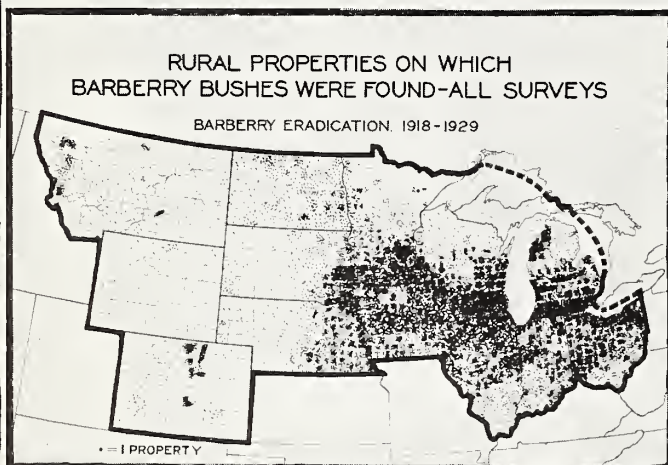


The average annual loss for the first five year period, 1919 to 1923, was approximately 33,000,000 bushels.

The average annual loss for the next six year period, 1924 to 1929, was approximately 10,500,000 bushels.

The losses to small grain crops caused by black stem rust have been reduced since the beginning of the barberry eradication campaign in 1918. The breeding of rust-resistant varieties, the use of early maturing varieties, and the sowing of crops early, have aided barberry eradication in this reduction.

"BARBERRY ERADICATION PAYS"



In southeastern Wyoming a general infection of stem rust was observed the last week in August, but it appeared too late to cause much injury. A few late maturing fields of wheat no doubt were injured to some extent, but the crop in the State as a whole was damaged very little.

No doubt the lack of black stem rust in Montana and Wyoming during the past season was partly due to dry weather conditions. There is, however, considerable evidence that the destruction of many barberry bushes has had a tendency to delay the first infection of stem rust in the spring.

All Known Methods of Rust Control Must Be Employed

While barberry eradication is of first importance, there are several known methods for reducing losses due to black stem rust. Early sowing of grain, proper preparation of the seed bed, avoidance of low, poorly drained land, proper use of fertilizers, in fact, anything that promotes early ripening of the grain, will help to reduce the danger from rust.

Certain varieties of wheat, oats, and barley that are more disease-resistant than others have been produced by plant breeders. Wherever these varieties meet the requirements of a given region and are desirable from the standpoints of yield, milling quality, and resistance to other cereal diseases, they should be substituted for the less satisfactory varieties.

New Strains of Destructive Black Stem Rust Develop on the Common Barberry

The production of rust-resistant varieties of grains probably will be much more successful when all common barberry bushes have been eradicated. The reason for this is shown in the recent important discoveries made in the Canadian Rust Research Laboratories at Winnipeg and by E. C. Stakman and his coworkers at the University of Minnesota. Both of these groups conducting independent research have proved that entirely new strains of black stem rust are produced if two different forms of the rust crossbreed on the barberry leaves. The certainty that new forms of the dangerous disease may appear suddenly, makes the eradication of the common barberry all the more imperative, since it is on the barberry alone that this crossing can occur in nature. The new and apparently resistant varieties of grains are not safe with barberries near. If for no other reason than to protect the new kinds of superwheat which are now in the process of being developed, all common barberry bushes should be destroyed.

Future Plans for Barberry Eradication in Montana and Wyoming

Within the next few years an attempt will be made to clean up areas of escaped barberry bushes in counties where they are known to be growing wild. To do this will require intensive surveys of rather extended areas in central Montana and southeastern and northern Wyoming. Barberry bushes have been growing in these localities for 40 years or more, allowing ample time for spread to occur. The first step will be to eradicate the fruiting bushes, and while doing this, care must be taken to destroy as many as possible of the smaller wild bushes. Experience has shown that barberry seeds may lie dormant for six to eight years before germinating. For this reason future plans must include some provision for reinspection of these escaped areas at intervals of two to four years until all seeds have germinated and the seedlings have been destroyed.

Summary

1. The object of the barberry-eradication campaign in Montana and Wyoming is twofold: (1) To locate and destroy all barberry bushes now growing in these States, and (2) to inform property owners regarding the description of the bush and its part in the dissimulation of rust, so they may destroy any bushes overlooked by field agents or that may subsequently develop from seed.

2. The first farm-to-farm survey of Montana has been completed. On 386 properties 12,273 bushes and 19,011 seedlings were found and destroyed. Of this number, 4,921 bushes and all of the seedlings had grown from seed scattered by birds or other animals. In Wyoming 4,154 bushes and seedlings have been destroyed on 96 properties in all surveys.

3. Chemical eradication has proved far more satisfactory than the old method of digging. All common barberry bushes found in Montana and Wyoming are killed with crushed rock salt if there is no danger of injuring other shrubbery or trees growing near by.

4. The cleaning up of areas of escaped barberry bushes will be one of the most difficult problems in these two States. It will be necessary to make repeated surveys in counties in which bushes are known to have spread to timberland, fence rows, creek banks, and other uncultivated lands.

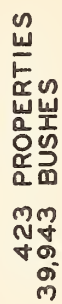
5. Figures compiled by the United States Department of Agriculture and the Conference for the Prevention of Grain Rust indicate that the average losses from stem rust are readily decreasing as the many thousands of barberry bushes are removed from the barberry-eradication area each year.

6. Stem rust losses in Montana and Wyoming during the season of 1929 were very slight. A general infection of rust was present in southeastern Montana and southeastern and central Wyoming late in August, but the spring-wheat crop in general was advanced beyond danger of injury. The first appearance of rust was again in 1929 much later than usual.

7. Factors important in the control of stem rust are: (1) The removal of the alternate host of the rust by the eradication of the common barberry; (2) the early seeding of spring wheat on well-prepared seed beds; and (3) the selection of economically desirable small-grain varieties least susceptible to black stem rust.

March 10, 1930.

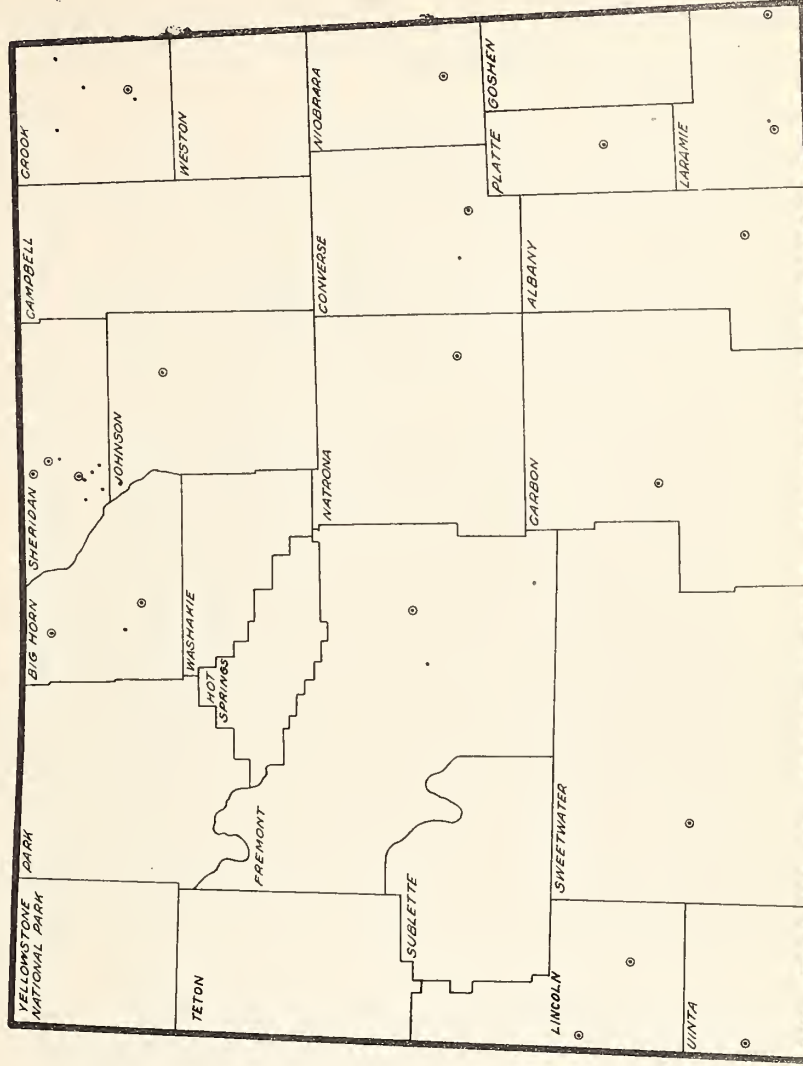
MONTANA



FARMS HAVING BARBERRY BUSHES
TOWNS HAVING BARBERRY BUSHES

PROPERTIES HAVING BARBERRY BUSHES 1918-1929

WYOMING



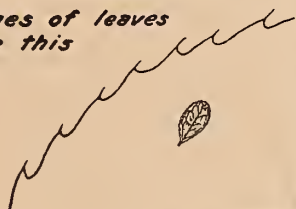
96 PROPERTIES
4,816 BUSHES

· FARMS HAVING BARBERRY BUSHES
○ TOWNS HAVING BARBERRY BUSHES

Common Barberry Spreads Black Stem Rust

*When you find
a spiny bush
with-*

*Edges of leaves
like this*



Spines like these



Berries like these



Inner bark yellow



*It is a
Common Barberry
and should be
reported at once*

**Know
Common
Barberry**

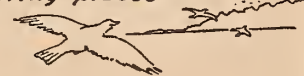
Look For It!

*Spread of
Barberries by
birds*

*Birds eat the
berries*



*Carry them to their
roosting places*



*Where they cough
up the seeds*



*From which seedling
bushes grow*



*They in time
bear fruit which
is again carried
farther on*

Look For and Report All Common Barberry Bushes

To the State Leader of Barberry Eradication, in care of your State Department
of Agriculture or your State Agricultural College.

Common Barberry Bushes

spread

Black Stem Rust

to

WHEAT, OATS,
BARLEY, RYE,
and Many Wild
Grasses

THIS Progress Report is prepared and printed by the Bureau of Plant Industry, U. S. Department of Agriculture, Washington, D. C. The cover is furnished by the Conference for the Prevention of Grain Rust, 300 Lewis Building, Minneapolis, Minnesota.